

Preliminary Results from the Mars Volatile and Climate Surveyor Polar Lander Meteorology Experiment

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The Mars Polar Lander Mars Volatiles and Climate Surveyor (MVACS) payload includes a comprehensive suite of meteorological instruments for characterizing the near-surface weather and climate at high southern latitudes on Mars (76S). Atmospheric pressures will be measured by four independent micro-machined capacitive aneroid barometers that were supplied to NASA by the Finnish Meteorological Institute. Atmospheric temperatures will be measured by thin-wire thermocouple arrays at 5 heights between 15 cm and 2.3 meters. These sensors are mounted on a pair of masts that will be deployed above and below the deck soon after landing. Atmospheric temperatures will also be monitored by a thin-wire platinum resistance thermometer that is mounted near the elbow of the MVACS robot arm. Wind velocities will be measured at a height of 2.4-m above the surface by a directional hot-wire anemometer that is installed at the top of the main Met mast. Wind speeds will also be measured within 20-cm of the surface by a hot wire anemometer. In-situ water vapor measurements will be acquired for the first time on the Martian surface by the tunable diode laser (TDL) spectrometer. This instrument also measures the carbon and oxygen isotopic abundances in water vapor and carbon dioxide. The kinetic temperature of the soil will be monitored for the first time by a soil temperature probe that is mounted near the robot arm's scoop.

In the baseline operational plan, pressures, temperatures, and winds will be measured at intervals between 1 to 3 seconds. Water vapor measurements will be acquired at intervals as short as 6 seconds. Meteorological measurements will be made for 5 to 55 minute periods every hour for up to 9 hours of each Martian Sol. During the remaining 15 hours and 38 minutes of each Sol, the Met instrument will be turned on up to four times to gather data for 5 to 10 minutes. In this talk, we will present the data acquired by this instrument during the first week of operations on the Martian surface.